IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application: Qiwei He et al.	)	Group Art Unit: 1796
	)	
Serial No. 10/773,547	)	Examiner: Peter D. Mulcahy
	)	
Filed: February 6, 2004	)	Atty. Docket No. 3021.NWN
	)	

For: IONOMER-CONTAINING HOT MELT ADHESIVE

BRIEF ON APPEAL

Commissioner for Patents
Alexandria, VA 22313-1450

Sir:

Applicants hereby appeal the decision of the Primary Examiner finally rejecting claims 1, 3, 5, 6, 22, 23 and 27-33.

A copy of the claims involved in this appeal is set forth in the *Claims appendix*.

(i) *Real party in interest*

The real party in interest is Henkel AG & Co. KGaA.

(ii) *Related appeals and interferences*

The Board is directed to the appeal relating to copending commonly assigned application Serial Nos. 10/587,374, as listed in the *Related proceedings appendix*.

(iii) *Status of Claims*

Claims 1, 3, 5, 6, 22, 23 and 27-33 are pending.

Claims 2, 4, 7-21 and 24-26 have been canceled. Canceled claims 7-20 are directed to nonelected subject matter.

Claims 1, 3, 5, 6, 22, 23 and 27-33 are rejected under 35 U.S.C. § 103 (a) as being

unpatentable over Boyce et al. (U.S. 4,284,542) in view of vanDrongelen et al. (US 6,103,814).

The rejection of claims 1, 3, 5, 6, 22, 23 and 27-33 is being appealed.

(iv) *Status of Amendments*

All amendments have been entered.

(v) *Summary of claimed subject matter*

Independent claim 1 is directed to a low application temperature hot melt adhesive. The adhesive comprises from about 5 to about 55 wt % of a thermoplastic elastomer, from about 30 to about 90 wt % of a tackifying resin and from about 0.1 to about 5 wt % of an ionomer resin. Page 2, lines 2-3, 7-12; page 3, lines 3-5, 20-21; page 5, lines 21-23.

Independent claim 27 is directed to an adhesive that comprises (a) from about 5 to about 35 wt % of a thermoplastic elastomer selected from the group consisting of styrene-isoprene-styrene (SIS), styrene-butadiene-styrene (SBS), styrene-isobutylene styrene (SIBS), styrene-b-ethylene/butylene-b-styrene (SEBS), styrene-b-ethylene/propylene-b-styrene (SEPS), radial copolymer $(SI)_n$ wherein n is equal or larger than 3, $(SB)_n$ wherein n is equal or larger than 3, and mixtures thereof, (b) from about 40 to about 70 wt % of a tackifying resin which is compatible with the mid-block of the block-copolymer (a), (c) from about 5 to about 30 wt percent of a thermoplastic hydrocarbon tackifier which is compatible with the end-block of the block-copolymer listed in (a), and (d) from about 0.1 to about 15 wt percent of an ionomer resin. Page 2, lines 7-12; page 3, lines 20-21; page 7 line 26 to page 8, line 6.

Independent claim 31 is directed to a hot melt adhesive consisting of from about 0.5 to about 55 wt % of a thermoplastic elastomer, from about 30 to about 90 wt % of a tackifying

resin, from about 0.1 to 40 wt % of an ionomer resin, 0 to about 40 wt % of a liquid diluent, 0 to about 25 wt % of a wax and 0 to about 3 wt % of an antioxidant. Page 2, lines 7-12.

(vi) *Grounds of rejection to be reviewed on appeal*

A. WHETHER CLAIMS 1, 3, 5, 6, 22, 23 AND 27-33 ARE UNPATENTABLY OBVIOUS OVER BOYCE ET AL. (U.S. 4,284,542) IN VIEW OF VANDRONGELEN ET AL. (US 6,103,814).

A-1 WHETHER CLAIMS 1, 3, 5, 6, 22 AND 23 ARE UNPATENTABLY OBVIOUS OVER BOYCE ET AL. (U.S. 4,284,542) IN VIEW OF VANDRONGELEN ET AL. (US 6,103,814).

A-2 WHETHER CLAIMS 27-30 ARE UNPATENTABLY OBVIOUS OVER BOYCE ET AL. (U.S. 4,284,542) IN VIEW OF VANDRONGELEN ET AL. (US 6,103,814).

A-3 WHETHER CLAIMS 31-33 ARE UNPATENTABLY OBVIOUS OVER BOYCE ET AL. (U.S. 4,284,542) IN VIEW OF VANDRONGELEN ET AL. (US 6,103,814).

(vii) *Argument*

A. Claims 1, 3, 5, 6, 22, 23 and 27-33 are patentable over Boyce et al. (U.S. 4,284,542) in view of vanDrongelen et al. (US 6,103,814).

Claims 1, 3, 5, 6, 22, 23 and 27-33 are rejected under 35 U.S.C. § 103 (a) as being unpatentable over Boyce et al. (U.S. 4,284,542) in view of vanDrongelen et al. (US 6,103,814).

Boyce is cited by the examiner as showing hot melt adhesives which incorporate the claimed ionomer resins and as further showing the combination of this resin with the claimed tackifiers. The examiner urges that incorporation of the thermoplastic elastomer is suggested at col. 6, lines 63+. While acknowledging that the claimed composition is not exemplified, the examiner urges that it would be obvious to select the thermoplastic elastomer from listed optional ingredients. The examiner further applies the vanDrongelen patent as showing species

of thermoplastic resins used in adhesive compositions. The examiner appears to urge that the use of the thermoplastic resins of vanDrongelen in the adhesive of Boyce would render applicants' claims obvious to one of ordinary skill in this art.

The examiner (see page 2 of the Advisory action, mailed April 30, 2009) argues that:

> The vanDrongelen patent shows each of the compositional ingredients and requisite amounts, but for the ionomer as provided by Boyce. The adhesives of vanDrongelen are presumed to have properties that anticipate and/or render obvious those claimed. The fact that the art is silent as to the claimed properties does not mean that they are not possessed by the adhesive compositions formulated by the same ingredients used in the same amounts. Once again, applicants have failed to show or allege that the art does not possess properties that anticipate and/or render obvious those claimed. To the contrary, it is reasonable to presume that the claimed properties are anticipated and/or obvious from the art given that these are the same compositional components used in the same amounts and ratios. The fact that the art is simply silent as to the claimed property does not mean that the properties do not exist in the adhesive of the prior art.

Applicants disagree. The claimed invention is not obvious over the disclosures of Boyce in view of vanDrongelen et al.

A(1). Claims 1, 3, 5, 6, 22 and 23 are patentable over Boyce et al. (U.S. 4,284,542) in view of vanDrongelen et al. (US 6,103,814).

Applicants have discovered that use of an ionomer additive in a thermoplastic elastomer-based hot melt adhesive provides excellent toughness and which makes it particularly advantageous when used in elastic attachments applications.

The hot melt adhesive of the claims 1, 3, 5, 6, 22 and 23 are formulated for application at low temperatures. A low application temperature hot melt adhesive is defined within applicants' disclosure as an adhesive capable of being applied at a temperature of between from about 200°F

to about 300°F (see, e.g., page 3, lines 4-5 and 8). The adhesives of the invention comprises a thermoplastic elastomer in amounts of from about 5 to about 55 wt %, a tackifying resin in amounts of from about 30 to about 90 wt % and an ionomer resin in amounts of less than 5 wt %, specifically in amounts of from about 0.1 to about 5 wt %.

Boyce discloses ionomer-based hot melt adhesives and sealant compositions that contain ammonium phosphate and have improved high temperature viscosity, which viscosity stability is measured viscosity at 205°C (401°F). The adhesives are described as having high mechanical strength and dead load creep resistance extending up to 100°C while still allowing pumping at 150°C-200°C (302°F-393°F). The Boyce compositions, which are not low application temperature hot melt adhesives, find use as glass sealants or adhesives for automobile windows. Preferably, the compositions also contain an inorganic filler, such as carbon black. Small quantities of a reinforcing agent may also be used and preferred reinforcing resins are disclosed at col. 6, lines 47-68. Such reinforcing agents are discloses as being used in amounts of up to 30 parts per hundred of the terpolymer ionomer resin. See also Example 7. The inclusion of a polystyrene resin in the amounts disclosed for use by Boyce would not render obvious applicants' claimed low application temperature adhesive. The disclosure of vanDrongelen fails to cure this defect so as to render the claimed invention obvious.

The vanDrongelen patent does not disclose a low application temperature hot melt adhesive. While viscosity data at application temperatures of 120°C (248°F) and 140°C (284°F) are reported, there is no disclosure that this is a temperature contemplated for adhesive application. At col. 55, lines 21-57, a method of determining creep performance (measured as

elastic retention/percent of original length) for a bond made through spiral coating is disclosed. The adhesive of vanDrongelen is applied at a temperature of 160°C (320°F) trough a nozzle heated to 160°C (320°F). I.e., the adhesive of vanDrongelen is not a low application temperature hot melt adhesive (an adhesive capable of being applied at a temperature of between about 200°F and 300°F).

There is no disclosure in the combined prior art that would motivate the skilled practitioner to add the polymers of vanDrongelen to the adhesive formulation of Boyce, and to modify the amounts of polymer and ionomer resin in the formulation to prepare a low application temperature hot melt adhesive as claimed by applicants. Again, the adhesive of Boyce is an ionomer-based adhesive whereas applicants' adhesive is a thermoplastic elastomer-based adhesive. Addition of the polymers of vanDrongelen to the formulation of Boyce, in the amounts taught by Boyce (in amounts of up to 30 parts per hundred of the terpolymer ionomer resin) would not result in applicants' claimed invention.

The examiner's arguments that the adhesives of vanDrongelen are presumed to have properties that anticipate and/or render obvious those claimed is without merit. First, the claims are not drafted in terms of any recited performance limitation. Second the vanDrongelen adhesive does not include ionomer. Finally, the examples set forth in applicants' specification clearly show that addition an ionomer additive can reduce melt viscosity and improve mechanical properties. Even if the rejection was based on the disclosure of vanDrongelen in view of Boyce, there is no disclosure in Boyce that would motivate the skilled artisan to use an ionomer resin in amounts of from about 0.1 to 5 wt % to formulate a low temperature applied hot melt adhesive

that also contains 5 to 55 wt % of a thermoplastic elastomer and from about 30 to about 90 wt % of a tackifying resin. Applicants' claimed invention represents a nonobvious and patentable contribution to the art.

Applicants' claimed invention represents a nonobvious and patentable contribution to the art.

Reversal of the examiners Section 103 rejection of claims 1, 3, 5, 6, 22 and 23 as being unpatentable over Boyce in view of vanDrongelen is requested.

A(2). Claims 27-30 are patentable over Boyce et al. (U.S. 4,284,542) in view of vanDrongelen et al. (US 6,103,814).

Applicants have discovered that use of an ionomer additive in a thermoplastic elastomer-based hot melt adhesive provides excellent toughness and which makes it particularly advantageous when used in elastic attachments applications.

The invention of claims 27 to 30 are directed to adhesives comprising (a) from about 5 to about 35 wt % of a thermoplastic elastomer selected from the group consisting of styrene-isoprene-styrene (SIS), styrene-butadiene-styrene (SBS), styrene-isobutylene styrene (SIBS), styrene-b-ethylene/butylene-b-styrene (SEBS), styrene-b-ethylene/propylene-b-styrene (SEPS), radial copolymer $(SI)_n$ wherein n is equal or larger than 3, $(SB)_n$ wherein n is equal or larger than 3, and mixtures thereof, (b) from about 40 to about 70 wt % of a tackifying resin which is compatible with the mid-block of the block-copolymer (a), (c) from about 5 to about 30 wt percent of a thermoplastic hydrocarbon tackifier which is compatible with the end-block of the block-copolymer listed in (a), and (d) from about 0.1 to about 15 wt percent of an ionomer resin.

Boyce discloses ionomer-based hot melt adhesives and sealant compositions that contain ammonium phosphate and have improved high temperature viscosity, which viscosity stability is measured viscosity at 205°C (401°F). The adhesives are described as having high mechanical strength and dead load creep resistance extending up to 100°C while still allowing pumping at 150°C-200°C (302°F-393°F). Preferably, the compositions also contain an inorganic filler, such as carbon black. Small quantities of a reinforcing agent may also be used and preferred reinforcing resins are disclosed at col. 6, lines 47-68. Such reinforcing agents are discloses as being used in amounts of up to 30 parts per hundred of the terpolymer ionomer resin. See also Example 7. The inclusion of a polystyrene resin in the amounts disclosed for use by Boyce would not render obvious applicants' claimed adhesive. The disclosure of vanDrongelen fails to cure this defect so as to render the claimed invention obvious.

There is no disclosure in the combined prior art that would motivate the skilled practitioner to add the polymers of vanDrongelen to the adhesive formulation of Boyce, and to modify the amounts of polymer and ionomer resin in the formulation to prepare an adhesive as claimed by applicants. Again, the adhesive of Boyce is an ionomer-based adhesive whereas applicants' adhesive is a thermoplastic elastomer-based adhesive. Addition of the polymers of vanDrongelen to the formulation of Boyce, in the amounts taught by Boyce (in amounts of up to 30 parts per hundred of the terpolymer ionomer resin) would not result in applicants' claimed invention.

The examiner's arguments that the adhesives of vanDrongelen are presumed to have properties that anticipate and/or render obvious those claimed is without merit. First, the claims

are not drafted in terms of any recited performance limitation. Second the vanDrongelen adhesive does not include ionomer. Finally, the examples set forth in applicants' specification clearly show the nonobvious effects that addition of ionomer produces. Even if the rejection was based on the disclosure of vanDrongelen in view of Boyce, there is no disclosure in Boyce that would motivate the skilled artisan to add ionomer resin in amounts of from about 0.1 to 15 wt % to an adhesive that also contains 5 to 35 wt % of a thermoplastic elastomer and from about 40 to about 70 wt % of a tackifying resin. Applicants' claimed invention represents a nonobvious and patentable contribution to the art.

Reversal of the examiners Section 103 rejection of claims 27-30 as being unpatentable over Boyce in view of vanDrongelen is requested.

A(3). Claims 31-33 are patentable over Boyce et al. (U.S. 4,284,542) in view of vanDrongelen et al. (US 6,103,814).

Applicants have discovered that use of an ionomer additive in a thermoplastic elastomer-based hot melt adhesive provides excellent toughness and which makes it particularly advantageous when used in elastic attachments applications.

The invention of claims 31-33 are directed to hot melt adhesives consisting of from about 0.5 to about 55 wt % of a thermoplastic elastomer, from about 30 to about 90 wt % of a tackifying resin, from about 0.1 to 40 wt % of an ionomer resin, 0 to about 40 wt % of a liquid diluent, 0 to about 25 wt % of a wax and 0 to about 3 wt % of an antioxidant.

Boyce discloses ionomer-based hot melt adhesives and sealant compositions that contain ammonium phosphate and have improved high temperature viscosity, which viscosity stability is

measured viscosity at 205°C (401°F). The adhesives are described as having high mechanical strength and dead load creep resistance extending up to 100°C while still allowing pumping at 150°C-200°C (302°F-393°F). Preferably, the compositions also contain an inorganic filler, such as carbon black. Small quantities of a reinforcing agent may also be used and preferred reinforcing resins are disclosed at col. 6, lines 47-68. Such reinforcing agents are discloses as being used in amounts of up to 30 parts per hundred of the terpolymer ionomer resin. See also Example 7. The inclusion of a polystyrene resin in the amounts disclosed for use by Boyce would not render obvious applicants' claimed adhesive. The disclosure of vanDrongelen fails to cure this defect so as to render the claimed invention obvious.

There is no disclosure in the combined prior art that would motivate the skilled practitioner to add the polymers of vanDrongelen to the adhesive formulation of Boyce, and to modify the amounts of polymer and ionomer resin in the formulation to prepare an adhesive as claimed by applicants. Again, the adhesive of Boyce is an ionomer-based adhesive whereas applicants' adhesive is a thermoplastic elastomer-based adhesive. Addition of the polymers of vanDrongelen to the formulation of Boyce, in the amounts taught by Boyce (in amounts of up to 30 parts per hundred of the terpolymer ionomer resin) would not result in applicants' claimed invention.

The examiner's arguments that the adhesives of vanDrongelen are presumed to have properties that anticipate and/or render obvious those claimed is without merit. First, the claims are not drafted in terms of any recited performance limitation. Second the vanDrongelen adhesive does not include ionomer. Finally, the examples set forth in applicants' specification

clearly show the nonobvious effects that addition of ionomer produces. Even if the rejection was based on the disclosure of vanDrongelen in view of Boyce, there is no disclosure in Boyce that would motivate the skilled artisan to add ionomer resin in amounts of from about 0.1 to 40 wt % to prepare a hot melt adhesive, the only other components being 0.5 to about 55 wt % of a thermoplastic elastomer, from about 30 to about 90 wt % of a tackifying resin, from about 0.1 to 40 wt % of an ionomer resin, 0 to about 40 wt % of a liquid diluent, 0 to about 25 wt % of a wax and 0 to about 3 wt % of an antioxidant. Applicants' claimed invention represents a nonobvious and patentable contribution to the art.

Reversal of the examiners Section 103 rejection of claims 31-33 as being unpatentable over Boyce in view of vanDrongelen is requested.

Respectfully submitted,

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(viii) *Claims appendix*

1. A low application temperature hot melt adhesive comprising from about 5 to about 55 wt % of a thermoplastic elastomer, from about 30 to about 90 wt % of a tackifying resin and from about 0.1 to about 5 wt % of an ionomer resin.

3. The adhesive of claim 1 further comprising up to about 40 wt % of a diluent and/or up to about 25 wt % of a wax.

5. The adhesive of claim 1 wherein the thermoplastic elastomer is styrene-isoprene-styrene, styrene-b-ethylene/butylene-b-styrene, styrene-butadiene-styrene or a mixture thereof.

6. The adhesive of claim 1, wherein the ionomer resin is selected from the group consisting of polymers and copolymers comprising moieties selected from the group consisting of carboxylate, sulphonate and phosphonate, which moieties are at least partly neutralized by metallic ions selected from the group consisting of Na^{+}, Li^{+}, Ca^{++}, Mg^{++}, Zn^{++}, Ba^{++} and Al^{+++}.

22. The adhesive of claim 1 which can be applied at a temperature of from 270°F to about 285°F.

23. The adhesive of claim 1 which can be applied at a temperature of from about 200°F to 250°F.

27. An adhesive comprising

a) from about 5 to about 35 wt % of a thermoplastic elastomer selected from the group consisting of styrene-isoprene-styrene (SIS), styrene-butadiene-styrene (SBS), styrene-isobutylene styrene (SIBS), styrene-b-ethylene/butylene-b-styrene (SEBS), styrene-b-ethylene/propylene-b-styrene (SEPS), radial copolymer $(SI)_n$ wherein n is equal or larger than 3, $(SB)_n$ wherein n is equal or larger than 3, and mixtures thereof,

b) from about 40 to about 70 wt % of a tackifying resin which is compatible with the mid-block of the block-copolymer (a),

c) from about 5 to about 30 wt percent of a thermoplastic hydrocarbon tackifier which is compatible with the end-block of the block-copolymer listed in (a), and

d) from about 0.1 to about 15 wt percent of an ionomer resin.

28. The adhesive of claim 27 wherein said ionomer resin is present in an amount from about 0.1 to about 5 wt %.

29. The adhesive of claim 27 further comprising a diluent and/or a wax, which diluent is present in amounts of up to about 30 wt % and which wax is present in amounts of up to about 5 wt % wax.

30. The adhesive of claim 27, wherein the ionomer resin is selected from the group consisting of polymers and copolymers comprising moieties selected from the group consisting of carboxylate,

sulphonate and phosphonate, which moieties are at least partly neutralized by metallic ions selected from the group consisting of Na^+, Li^+, Ca^{++}, Mg^{++}, Zn^{++}, Ba^{++} and Al^{+++}.

31. A hot melt adhesive consisting of from about 0.5 to about 55 wt % of a thermoplastic elastomer, from about 30 to about 90 wt % of a tackifying resin, from about 0.1 to 40 wt % of an ionomer resin, 0 to about 40 wt % of a liquid diluent, 0 to about 25 wt % of a wax and 0 to about 3 wt % of an antioxidant.

32. The adhesive of claim 31 consisting of

a) from about 5 to about 35 wt % of a thermoplastic elastomer selected from the group consisting of styrene-isoprene-styrene (SIS), styrene-butadiene-styrene (SBS), styrene-isobutylene styrene (SIBS), styrene-b-ethylene/butylene-b-styrene (SEBS), styrene-b-ethylene/propylene-b-styrene (SEPS), radial copolymer $(SI)_n$ wherein n is equal or larger than 3, $(SB)_n$ wherein n is equal or larger than 3, and mixtures thereof,

b) from about 40 to about 70 wt % of a tackifying resin which is compatible with the mid-block of the block-copolymer (a),

c) from about 5 to about 30 wt percent of a thermoplastic hydrocarbon tackifier which is compatible with the end-block of the block-copolymer listed in (a),

d) from about 0.1 to about 15 wt percent of an ionomer resin,

e) from 0 to about 30 wt % of a liquid diluent,

f) from 0 to about 5 wt % of a wax, and

g) from 0 to 3 wt % of an antioxidant.

33. The adhesive of claim 31 wherein said ionomer resin is present in an amount from about 0.1 to about 5 wt %.

34. The adhesive of claim 33 wherein said ionomer resin is selected from the group consisting of polymers and copolymers comprising moieties selected from the group consisting of carboxylate, sulphonate and phosphonate, which moieties are at least partly neutralized by metallic ions selected from the group consisting of Na^{+}, Li^{+}, Ca^{++}, Mg^{++}, Zn^{++}, Ba^{++} and Al^{+++}.

(ix) *Evidence appendix*

NONE

(x) *Related proceedings appendix*

A. Serial No. 10/587,374 (Attorney Docket No. 3057.NWN), filed February 6, 2004 in the names of Qiwei He and Michael G. Harwell. Assigned to Henkel AG & Co. KGaA.